Catmint (*Nepeta nuda* L.) phylogenetics defined by nuclear and chloroplast DNA barcodes

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Abstract

Nepeta nuda L. (Lamiaceae) is a medicinal plant with a wide distribution in Europa and Asia. In Bulgaria, *N. nuda* is also known as "naked (or hairless) catmint", which likely refers to the naked or sparse short hairy stem and leaves. This study aims to generate DNA barcodes for precise genetic discrimination and determination of phylogenetic position of the plant among other *Nepeta* species. To achieve this goal, we applied the DNA barcoding technique based on conserved nuclear (internal transcribed spacer/ITS) and chloroplast (*rbcL*, *matK*, *trnH*) DNA regions. The generated DNA barcode sequences were submitted to the Barcode of Life Data System (BOLD) database (https://www.boldsystems.org; accession number BUL002-22). The obtained *N. nuda* DNA barcodes and corresponding sequences of other *Nepeta* species available in the BOLD and NCBI database were utilized for taxonomic classification. ITS-derived sequences for *Nepeta* species were the most enriched in the database, and DNA fragments matching 47 *Nepeta* species were selected for construction of phylogenetic tree. The results show that *N. nuda* is clustered in a subclade together with *N. sheilae*, *N. deflersiana*, *N. isaurica*, *N. congesta*, *N. heliotropifolia*, *N. schiraziana* and *N. cataria*. The information in BOLD was also retrieved for *rbcL* and *matK*, and corresponded to 15 and 10 different *Nepeta* species, respectively. For *trnH*, only NCBI sequences corresponding to 6 different *Nepeta* species were found. The three chloroplast markers highlighted the close relation of *N. nuda* to *N. italica*, *N. tuberosa*, *N. cataria*, *N. grandiflora* and *N. hemsleyana*. In conclusion, we suggest a DNA barcode system for genetic discrimination of *N. nuda*, which could assist its accurate taxonomic characterization.

Keywords

DNA barcodes, genetic discrimination, *Nepeta nuda*, phylogenetic position

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Conflicts of interest